

SPACE WEI QI

The Launch of *Shenzhou V*

Joan Johnson-Freese

W*ei Qi* is the favorite Chinese board game—chess with more than two hundred pieces rather than sixteen, allowing for significantly increased strategic complexity. When Lieutenant Colonel Yang Liwei lifted off into space from China’s Jiuquan launch site just after 9 AM on 15 October 2003, returning twenty-one hours later after sixteen orbits around the earth, China made a significant geostrategic *Wei Qi* move. China views long-term geostrategic politics as having about the same number of possible permutations as a *Wei Qi* board, and it is posturing accordingly. The *Shenzhou V* launch was part of that posturing.

Dr. Johnson-Freese is the chair of the Naval War College’s National Security Decision Making Department. She has served as Chair, Transnational Issues Department at the Asia-Pacific Center for Security Studies, in Honolulu; taught at the Air War College at Maxwell Air Force Base, Alabama; was a visiting fellow at the Institute of Space and Aeronautical Science in Sagami-hara, Japan; and directed the Center for Space Policy and Law in Orlando, Florida. Her publications include The Chinese Space Program: A Mystery within a Maze (1998) and Space, the Dormant Frontier: Changing the Paradigm for the 21st Century (1997). This article updates her “China’s Manned Space Program: Sun Tzu or Apollo Redux?” which appeared in the Summer 2003 issue.

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Perched atop a Long March (CZ-2F) launcher, the *Shenzhou V* spacecraft took China’s first taikonaut on a trip thoroughly rehearsed during four unmanned precursor missions.¹ Within China, a publicity campaign was carefully crafted to bring interest and national pride to a peak at the time of the event. Worldwide, media attention was considerable. Prelaunch speculation about the implications of the Chinese manned space program ranged from dubbing it a stunt to speculation about a new space race, to angst over its potential military significance.

Postlaunch, China has reveled in its success internally and accepted accolades from world leaders. What comes next, however, remains uncertain. Although the *People’s Liberation Army Daily* proclaimed on launch day, “The whole world will remember the

Chinese name Yang Liwei,” that has not proven to be the case in the United States, at least not initially.² Indeed Yang’s flight was almost a nonevent for Americans, among whom it was unable to compete for public attention with other priorities, from the war in Iraq to the baseball playoffs. Clearly, however, external players, especially the United States, will significantly influence the future path of China’s space program. This is especially true given the anticipated plans to reinvigorate the U.S. manned space exploration program. *What* the United States plans to do is important, but in the context of geostrategic politics *how* is even more important. While a space race is not a foregone conclusion, it is a possibility.

In this game of Wei Qi, the next move goes to the United States, which has three basic options. It can do nothing, which equates to sending congratulations and then continuing a policy that has excluded China from cooperative space efforts. This option would likely result in China’s setting its own course in space and working with countries other than the United States. Alternatively, the United States can throw down the gauntlet and commence with a new manned space race, announcing unilateral plans and forcing China into a pace it likely cannot afford. Or the United States can initiate an incremental program of space cooperation among China, itself, and other international partners. This option has the potential to reinvigorate the American manned space program and shape the future direction of China’s space efforts. It is important to remember too that while Wei Qi involves two players, and while this discussion focuses on the United States and China, there are other players simultaneously involved, interacting with both countries as well. This complication both expands and influences the options of the United States and China, and it means that Washington’s next move will be significant on the larger geostrategic gameboard.

THE RELATIVE POSITIONS OF THE UNITED STATES AND CHINA

How Washington wants U.S.-China relations to evolve is far from clear. After the Cold War, the United States began looking around for the “next enemy” to prepare for—the security community judiciously and appropriately planning for the future. As the only country of sufficient size and resources to become potentially a peer competitor, and the largest remaining communist country, China succeeded the Soviet Union almost by default. With China pursuing an ambitious space program built utilizing dual-use technologies, and space being an area considered by the United States as critical to its own strategic future, competition in space quickly emerged as an area of possible, indeed likely, contention.

Since 9/11, U.S.-China relations have warmed somewhat, with the United States seeking Chinese cooperation regarding the global war on terrorism. Also, China seems to still have some influence over North Korea and has been helpful

to the United States on that issue. Even in the usually contentious area of China-Taiwan-U.S. relations, on 10 December 2003 President George W. Bush welcomed Premier Wen Jiabao to Washington, calling him a “partner” in diplomacy and in a statement warning Taiwan against changing its relationship with mainland China.³ Since space activity has always been somewhat of a barometer of larger U.S.-China relations, the current period is one of both particular uncertainty and opportunity.

The Chinese, while advocating a treaty to ban space weapons, have also pursued antisatellite technology.⁴ Kinetic-energy weapons, jammers, parasite satellites that can surreptitiously attach themselves to other satellites, and high-powered ground-based lasers are all on the Chinese menu of options being pursued. The Chinese are also interested in navigation satellites, which can enhance missile targeting capabilities.⁵

China has recently partnered with the European Union (EU) on the Galileo navigation satellite system being developed by the EU as an alternative to the American Global Positioning System (GPS).⁶ China has committed approximately \$259 million in hard currency to this project, a system that is worrisome for Washington even without Chinese involvement because of its potential to interfere technically with GPS. Signing on to Galileo early gives China a stakeholder position, and it will be working with EU countries on both technical and manufacturing aspects of the program.⁷ Clearly, China is taking a two-track approach to space matters: discouraging international activity in space weapons while actively pursuing countermeasures and options of their own. The latter has been the focus of respective U.S.-China space posturing.

CHINESE PAYOFFS FROM SPACE

China faces Herculean challenges on a daily basis keeping its population employed, fed, housed, and subsequently stable.⁸ Why, then, would its leaders spend severely limited government resources on a manned space program? There are many reasons, in addition to which Chinese program supporters had the benefit of being able to learn from the American and Russian experiences. China has read the playbooks from both countries on how to maximize program benefits and strategic opportunities. Additionally, in terms of the technology used, China did not reinvent the wheel but instead chose to build on proven Russian designs.

Project 921, as this, the second Chinese attempt at a manned space program, is called, was initiated and championed by former Chinese president, and still head of the military, Jiang Zemin.⁹ It was undertaken in 1992 because the time was ripe: China was on an economic upswing and more technologically adept than during its first attempt in the 1970s;¹⁰ China desired advanced space technology for both domestic telecommunications and the military; and the

program created a positive focal point for national pride to counter negative 1989 Tiananmen Square images.

China has not, however, sent a man into space because Jiang Zemin is a space visionary, yearning to explore the heavens as an expression of humankind's essential nature. Jiang is a pragmatist, a skilled politician and a technocrat who ascended to power by maneuvering his way through the Byzantine maze of China's power structure. His support for the manned program—publicly evidenced by his visit to Johnson Space Center in October 2002, his presence at the March 2003 launch of the *Shenzhou III* unmanned precursor, and ultimately more importantly, through sustained government funding—has been a calculated risk. Domestic pride and international prestige, economic development (including skilled jobs and expanded science and engineering educational programs), and dual-use technology development are all proven reasons for pursuing manned space programs. Jiang understood that if space successes are spectacular, so too are space failures. Not only were national goals on the line but his own position relative to his successor as president, Hu Jintao. Failure would be devastating.

As it turned out, success may have had personal implications as well—one of the few surprises of the carefully choreographed launch was the absence of Jiang Zemin. Although he had been scheduled to speak to the taikonaut during the launch and offer congratulations afterward, he was conspicuously missing from the launch site and media events. While a disaster would have certainly reflected poorly on Jiang, apparently being poised to accept credit, even by inference, presented issues as well for him. It was Hu Jintao at the launch site who spoke to Yang before the launch, Hu on the phone during the flight, and Hu there to proclaim the mission a complete success afterward. Twice on CCTV (China Central Television) news on the evening of the flight Hu spoke, saying that he was representing Jiang. *People's Daily* reported that “in a phone call to [General] Li Jinai, chief commander of China's space program, Jiang said, ‘I am very happy and excited to hear that our country's first manned space flight has turned out to be a complete success.’”¹¹ CCTV also showed footage of the Chinese defense minister, General Cao Gangchuan, talking to Yang in orbit. Cao too said he was representing Jiang. But it was clearly Hu that dominated the news that Wednesday night, with CCTV airing long portions of his two speeches on the space launch.¹²

Jiang's absence at the pre- and postlaunch events possibly indicated ambiguity about how the Chinese leadership wants the launch perceived. Since Jiang's sole remaining formal post is that of chairman of the Communist Central Military Commission, a visible role for him might have sent too loud a message about military involvement. Although the Chinese want the United States to view the Chinese military capabilities with respect, they do not want it to view this launch as a threat that requires a response. But since both People's Liberation Army (PLA)

Generals Cao and Li were in attendance, perhaps Jiang's absence primarily indicates Jiang's further distancing from power, *pari passu* with Hu's rise.¹³

Pride and Prestige

The 1957 launch of Sputnik was a huge psychological boost for both the Soviet people and the Soviet government during the Cold War, and conversely a huge blow to both the people and the government of the United States. Pride, and a consequent "rallying-around" in the Soviet Union after Sputnik (as experienced as well in the United States after the Apollo moon landing), also translated into credibility and hence governmental legitimacy. Credibility and legitimacy are important considerations in Beijing. One Chinese official stated of the *Shenzhou V* launch, "This is not America where money comes from the taxpayers. This is money of the Communist Party—they would do with it what they decide. It is great they are investing in something that makes us proud."¹⁴ Beijing's interest in manned spaceflight for reasons of domestic pride and international prestige parallels its interest in bringing the Olympics to Beijing in 2008. Indeed, Yang carried an Olympic flag with him into orbit, unfurling it ceremoniously upon his return.¹⁵

Six centuries ago a Ming dynasty inventor, Wan Hu, is said to have strapped rockets onto his chair and ordered his assistants to light them. When the smoke cleared, Hu and the chair were, not surprisingly, gone. Yang Liwei has now joined Wan Hu as a space hero. A statue of Yang is already planned in his home province, Liaoning, a rust-belt region ripe for the revitalization Yang is intended to inspire. The *Shenzhou V* capsule will be displayed at the Millennium Monument in Beijing, where crowds estimated in the thousands celebrated at the time of the launch.

Most celebrations appeared largely choreographed, as opposed to the many celebrations that spontaneously erupted when Beijing was named the 2008 Olympic host city. The space mission was both an event meant to be filmed and shown to the world, and one directed by and supported from the top levels of government. Having planned celebrations at the Millennium Monument rather than in Tiananmen Square also deflected comparisons with or reference to other times in Tiananmen that were neither celebratory nor reflective of national pride and unity.

The diminutive (and now promoted) Colonel Yang's biography reads like "the right stuff"—thirty-eight, college-educated, fighter pilot, selfless wife, adoring son. He is described as having been a bright youth and a bit of a mischief maker. In postlaunch interviews he is personable, connecting well with average people. His political credentials must also be assumed impeccable, as he is both the new poster boy for the Chinese leadership and the role model for China's youth.

Launching a man into orbit is a technical feat not achieved by any of the other regional space contenders, including Japan and India, and it carries with it

significant leadership cachet. Officials from around the world, and particularly the region, sent congratulatory telegrams to President Hu Jintao. In India, however, space officials downplayed the technical aspects of China's launch, confidently asserting that India could do the same if it chose to, which they said it did not. Economics and need (what can a manned mission achieve that an unmanned mission cannot?) were cited as reasons for that choice.¹⁶ However, Indian prime minister Atal Bihari Vajpayee congratulated China on its success and publicly encouraged Indian scientists to work toward a manned lunar mission. "Those who wonder what could be achieved by such space missions simply want the status quo to continue," he proclaimed prior to the launch.¹⁷ It is unclear to or about whom he was speaking—the rest of the world, his own scientific community, or perhaps both. Just two days after China's taikonaut launch, India launched into orbit its most sophisticated remote sensing satellite to date. The lack of consequent fanfare certainly validated Beijing's manned spaceflight approach for maximum prestige value.

Initial Japanese responses to the launch varied. Some space officials discounted the technical significance of the event while nonetheless congratulating China. One Japanese official spoke directly in geostrategic terms. "Japan is likely to be the one to take the severest blow from the Chinese success. A country capable of launching any time will have a large influence in terms of diplomacy at the United Nations and military affairs. Moves to buy products from a country succeeding in manned space flight may occur."¹⁸ Space Activities Commission member Hiroki Matsuo candidly stated that "discussions on manned space flight have long been simmering in Japan," and he further implied that the launch would likely trigger a reconsideration of Japanese goals for space development. One woman on the street was quoted in Japanese media coverage as saying, "It's unbelievable. Japan lost in this field."¹⁹ While Japan's "losing" to China through Yang's launch was more perception than reality, China's success juxtaposed against power failures on both the Japanese environmental satellite Midori-2 and its first Mars probe, Nozomi, as well as the November launch failure of two spy satellites, has already resulted in calls for a reexamination of the Japanese program.²⁰

Clearly, China has established at least the perception of being the regional technology leader, and other countries will feel some necessity to respond. Japan and India are both technically capable of manned programs if they can muster and sustain the political will, but that political will is often elusive in democracies. Safety considerations increase the cost of a manned-rated spacecraft by a factor of about ten. Furthermore, public opinion polls have consistently shown that while people like the idea of manned spaceflight, they do not highly prioritize it compared to other concerns of government, such as schools, roads, health care, and defense. Space is seen as relatively expendable.

Internationally, China has joined the United States and Russia in an exclusive club of countries capable of manned spaceflight. It has regained what it considers its rightful place among the world's technology leaders, a place that China claims on the basis of a long historical legacy as the country responsible for gunpowder and fireworks. But prestige alone is insufficient for justifying the expenditures inherent in a manned space program. Pragmatic domestic returns are necessary as well.

Development

Among his other tasks as a hero, Yang is expected to stir China's youth to pursue educational programs in science, engineering, and technical careers, to give them hope of someday being involved with the space program. In both the United States and Japan, the "best and the brightest" university students are known to join companies based on recruiters' hype about involvement in space programs. Though the graduates may spend their careers making washing machines, pride in association with space efforts seems relevant in both education and career choices.

Education is important to China because a space program generally, and a manned program specifically, fits in with Beijing's plans for economic development. In the late 1950s and early 1960s Europe joined the space race because it believed that space equaled technology, technology equaled industrialization, and industrialization equaled economic growth. China's 2000 space white paper expresses much the same view.

The Chinese government attaches great importance to the significant role of space activities in implementing the strategy of revitalizing the country with science and education and that of sustainable development, as well as in economic construction, national security, science & technology development and social progress. The development of space activities is encouraged and supported by the government as an integral part of the state's comprehensive development strategy.²¹

Education is a prerequisite for building an industrial base, and development in China requires jobs, skilled jobs. When it began Project 921 China wanted to develop a cadre of trained engineers and scientists, and it has come a long way in that regard. China is proud of the fact that 80 percent of the workforce involved in that project is under forty years old, many under thirty.²²

The China Aerospace Science and Technology Corporation (CASC), the organization primarily responsible for executing the manned program, employs over 150,000 people and has 130 subordinate organizations. The size of the Chinese space enterprise is not unusual. In the United States during Apollo, there was also the expectation that the nation would not only send a man to the moon and safely return him but do it while employing people in all fifty states.

Although China does not have congressional pork-barrel politics to contend with, it does have a populace of over 1.3 billion to keep employed. While many of the large Chinese State-Owned Enterprises (SOE) are being privatized, a slow approach is being taken, in order to balance economic efficiency with the need to keep people working. Indeed, during a 1997 visit by the author to the Xichang launch site, an employee mentioned that several people shared his job, impeding his effectiveness. In some instances, that is the price paid for employment stability and providing on-the-job experience. The more numerous the experienced Chinese workers in skilled-labor jobs, the better the chance that the government will be able to attract global industries and achieve economic development. Employment, attracting industry, and selling high-tech products and services, including within the aerospace field, are all Chinese priorities. Postlaunch comments from Yan Xuetong, a political scientist at Tsinghua University, reflect those priorities: “Now,” he said, “people will realize that we don’t only make clothes and shoes.”

Military Implications through Dual-Use Technology

Clear technological gains are inherent in a space program, many with spillover advantages to the military. China is acutely aware of the military superiority of the United States. Accordingly, like David facing Goliath, China focuses on asymmetrical approaches for dealing with the United States, should it have to, over issues like Taiwan. Many of those approaches include using space capabilities as force multipliers, which, understandably, causes concern for the U.S. military. China has concerns with space as well.

Militarily, China watched the United States establish space dominance in the first Gulf War, Kosovo, Afghanistan, and Operation IRAQI FREEDOM. “We are so dominant in space that I pity a country that would come up against us,” said Major General Franklin Blaisdell, director of space operations for the Air Force, eight days before IRAQI FREEDOM began.²³ Indeed, the United States has made it clear it is seeking not just space superiority but “full spectrum” space dominance.

Politically, China has observed the rise in Washington of the “Blue Team” as a major influence on the U.S. government’s China policy. The Blue Team began in the late 1990s as a group of congressional staffers, think-tank analysts, and academics who vocally and voraciously viewed China as the next enemy. Many of its members, Washington outsiders during the Clinton years, have become insiders with the Bush administration.

In 2001, two events occurred that were critical from the Chinese perspective. First, the United States issued the Space Commission Report, developed by a group chaired by Donald Rumsfeld before he became secretary of defense. What

caught the attention of the Chinese was the report's statement that space would inevitably become a battleground for which the United States would be remiss not to prepare, the unspoken assumption being that preparation meant the development of space weapons.²⁴ Second, the United States that year held its first-ever space war game, called SCHRIEVER I.²⁵ In that well-publicized game, American forces were pitted against an opponent threatening a small island neighbor of about the size and location of Taiwan. It did not take the Chinese long to conclude that they in turn would be remiss not to prepare for the inevitability of U.S. development of space weapons, of which they might be the target. A Hong Kong news service quoted a Chinese official that same year as saying, "For countries that can never win a war with the United States by using the method of tanks and planes, attacking an American space system may be an irresistible and most tempting choice."²⁶ Both China and the United States see space assets as so valuable to their national security equation that any advance in the capabilities of one country is viewed by the other as not just a threat but as a setback.

Recent U.S. attention to the concept of "negation" has only increased Chinese concerns. Negation refers to actively denying the use of space for intelligence purposes to any other nation at any time. Because it bolsters even further the idea of U.S. space dominance, it is not just the Chinese who are upset by this concept but allies as well.²⁷

So the question becomes, what has the Chinese military gained as a result of its manned space efforts? One set of benefits is relatively indirect. In a 21 October 2003 article in *People's Daily*, Zhang Qingwei, deputy commander of China's manned space project and president of CASC, gave specific information about both the rocket and the capsule.²⁸ He said that China had achieved breakthroughs in thirteen key technologies, including reentry lift control of manned spacecraft, emergency rescue, soft landing, malfunction diagnosis, module separation, and heat prevention. Earlier Chinese publications have cited additional areas of technical advancement, including computers, space materials, manufacturing technology, electronic equipment, systems integration, and testing. Spacecraft navigation, propulsion, and life support were specifically cited for potential application to dual-use civil/military projects.²⁹ Moreover, the Chinese military will benefit from experience in areas such as on-orbit maneuvering, mission management, launch-on-demand, miniaturization, and computational analysis. Experience extends not just to building hardware but program management and integration as well.

For the Shenzhou program, China took a workhorse Russian Soyuz design to make its own. Both spacecraft have a service module housing the propulsion system, a command module, and an orbital module with a docking ring. Both Shenzhou and the Soyuz TM are capable of carrying three taikonauts/cosmonauts.

The Shenzhou orbital module, however, has a second set of solar panels, enabling it to remain in orbit independently for prolonged periods. The Russians worked closely with the Chinese, who, having no manned spaceflight experience, bought selected Russian systems, including life support (notably the pressurized suit worn by the taikonauts) and upgrades. However, the price was often too high, and in some cases China built its own technology in order to understand better the fundamentals involved.

Shenzhou, then, bears an uncanny resemblance to the Soyuz spacecraft; nonetheless, differences are apparent. A chart (see table 1) published with Zhang Qingwei's interview with *People's Daily* provides comparisons. In that interview Zhang also suggested that Shenzhou has more in common with second-generation spacecraft produced by both the Soviet Union and the United States, such as the Gemini or Soviet Voskhod spacecraft, than the first-generation Mercury (or, it could be added, Vostok). Another figure (reproduced as table 2) in *People's Daily* corroborates that view, which has been independently cited in the West as well.³⁰

TABLE 1
COMPARISON BETWEEN "SOYUZ TM" AND "SHENZHOU"

Project	Soyuz TM	Shenzhou
Launch mass (T)	7	7.8
Maximum cabin diameter (m)	2.2	2.5
Reentry mode	Semi-ballistic	Lifting
Precision of landing site	Circle with a radius smaller than 30 km	Theoretical deviation 15 km \pm 9 km
Reentry overload peak (g)	3–4	3.24

Source: "Advantages of 'Shenzhou' Spacecraft, 'Long-March' Carrier Rocket," *People's Daily*, 21 October 2003.

Direct military benefits for the Chinese from expanded space capabilities include upgrades to their Jiquan launch site and to their entire tracking system.³¹ Further, and notwithstanding that both the U.S. and the Soviet militaries have been unable to identify important advantages of a man in space over unmanned systems, the Chinese seem determined to explore that premise for them-

selves, likely through the use of the orbital module at some later date.³² The *Shenzhou III* precursor mission in March 2002 left its orbital module aloft, where it remained for six months. It is believed to have carried sophisticated electronic equipment; the Chinese stated that the equipment was an Earth-science radiometer; others believe that the module carried a significant electronic intelligence-collection payload.³³ *Shenzhou V* also left its orbital module aloft, unmanned, likely again carrying militarily relevant equipment. At some point, the Chinese may leave a taikonaut in orbit for a period of time. Clearly, they are intent on getting the maximum return from their investment and will explore all potential uses of the Shenzhou hardware.

POSTLAUNCH OBSERVATIONS

Together, all of these factors make manned space a high-yield program for the Chinese. The Chinese realize that seeking parity with the United States in space

TABLE 2
FIRST U.S., CHINESE, AND SOVIET SPACECRAFT:
MAIN TECHNOLOGICAL INDEXES

Project	Mercury	Vostok	Shenzhou
Launch mass (T)	Around 1.4	Around 4.7	7.8
Maximum cabin diameter (m)	1.8	2.3	2.5
Reentry mode	Ballistic	Ballistic	Lifting
Power	Storage battery	Storage battery	Solar cell array
Structure	Cabin, braking module	Reentry module, instrument module	Attached section, orbital module, reentry module, propelling module

Source: "Advantages of 'Shenzhou' Spacecraft, 'Long-March' Carrier Rocket," *People's Daily*, 21 October 2003.

technology is unrealistic. They are, however, determined not to allow the technology gap to grow any further; Program 921 is part of that effort. In the short term, the returns they have reaped have clearly met their expectations (the only disappointment being that Yang was unable to see the Great Wall from

space). It is the longer term for which experts and pundits both inside and outside China are now making "best guesses."

A clue regarding what the Chinese would like from the United States in response to their taikonaut launch is the docking ring on the Shenzhou orbital module. That ring technically enables the Shenzhou to dock with either the space shuttle or the International Space Station (ISS). The ISS has been a particular thorn in the side of the Chinese. According to the NASA website, "The ISS continues the largest scientific cooperative program in history, drawing on the resources and scientific expertise of 16 nations." While inability to provide a meaningful contribution might previously have been enough to justify China's exclusion from that collaboration, it did not stop American cooperation with other, often developing, countries where political benefits were considered substantial. *Shenzhou V* has now demonstrated China's ability to contribute to manned spaceflight programs. The only remaining "glitch" is politics.

The U.S. Reaction

While the rest of the world immediately heaped praise on China after the launch, the United States was more circumspect. Bill Nelson (a Democrat from Florida, and in 1986 a space shuttle astronaut) offered congratulations "on behalf of the Senate" during the flight: "My hope is that China will become a partner in our ongoing international efforts, such as the International Space Station, to make technological advances and to help solve mysteries of outer space."³⁴ NASA Administrator Sean O'Keefe also sent his congratulations to China that day, calling

the event “an important achievement in the history of human exploration.” He went on to say, “The Chinese people have a long and distinguished history of exploration” and that “NASA wishes China a continued safe human space flight program.” Chinese-American astronaut Edward Lu wished Yang Liwei well, in Chinese, from the ISS.

However, not everyone reacted either as quickly or enthusiastically. Reticence about congratulating the Chinese on space achievements is linked to anticipated issues associated with potentially lifting the current ban on launching American satellites on Chinese rockets. The ban was imposed subsequent to the Cox Committee Report of May 1999 (issued by the House Select Committee on U.S. National Security and Military/Commercial Concerns with the People’s Republic of China) on purported Chinese acquisition of American technology in a number of sensitive areas, including nuclear weapons, high-performance computers, and missile and space systems. Congressman Christopher Cox’s committee had focused in part on accident reports on a series of Chinese launch failures involving U.S.-built satellites in the 1990s.³⁵ The aftereffects of that report continue to fuel American reluctance to engage in cooperative space activities with China.

As for President Bush, in remarks to the press on 19 October 2003 at the Asia Pacific Economic Cooperation (APEC) meeting in Thailand, he announced, “I congratulated China on its recent space launch.” President Bush had spoken to President Hu at a meeting that day in which he focused on fair trade, the global war on terrorism, and North Korea.³⁶ The letter of congratulations delivered to President Hu reads:

On behalf of the American people, I congratulate you and the Chinese people on the successful completion of China’s first human space mission. I was pleased to learn that Lieutenant Colonel Yang Liwei returned safely to earth. This mission was an historic triumph for the Chinese people and a milestone in the continued exploration of space. The United States of America warmly welcomes the People’s Republic of China’s achievement in becoming only the third country to launch an astronaut into space, and wishes you continued success in this endeavor.³⁷

It is interesting to compare President Bush’s polite and generic congratulations of 19 October to the effusive and specific telegram sent by Russian President Putin the day after the launch.³⁸

Please accept our most sincere congratulations in connection with the historic event in China’s life—the first spaceflight of a Chinese cosmonaut. This is a worthy and weighty outcome of the efforts that the people of China have been making for many years, and of your country’s successful advancement along the road of comprehensive development and transformation of your country into a modern state of worldwide dimension. We are confident that China’s full-fledged membership of the family of space powers will serve the cause of securing peace, security and stability on

Earth, development of science and technology, and progress of planet Earth's civilization. Russian-Chinese space cooperation is an important trend in bilateral relations. It is making progress, it has good prospects for the future and, undoubtedly, it will bear more fruit for the benefit of our nations. Please pass our congratulations and good wishes to all those who contributed to the project to build a manned spacecraft and, of course, to the first Chinese cosmonaut.³⁹

Putin here calls China a modern state and a full-fledged member of the international space community, and seeks extended bilateral space cooperation. The United States, in contrast, is ambivalent about congratulating a communist government and welcoming China to the international space family.

The pictures presented to the world on 15 October 2003 were of a smiling Yang Liwei and the *Shenzhou V* capsule successfully returning from orbit. The images were not only peaceful but contrasted starkly with the U.S. situation at the time—the shuttle still grounded, leaving the United States reliant on the Russians to ferry crews and supplies to the International Space Station, and the American space community still waiting for the high-level space directive promised when the *Columbia* investigation concluded.

Not since President John F. Kennedy and the Apollo program has the United States had a real space vision or NASA a clearly defined mission. Presidential tapes released in 2001 evidenced to a surprised American public what the space policy community had long known—that even Kennedy was not an inspired visionary regarding space but a pragmatist using space as a Cold War tool capable of yielding returns in multiple areas. Without a justifying reason, usually tied to foreign policy or strategic posturing, manned spaceflight is an orphan. The Clinton administration utilized manned space as a way to build bridges with Russia after the Cold War and to keep large numbers of Soviet rocket/missile engineers employed and out of the international job market. Hence, the American and Russian manned space programs were merged.

So, did the *Shenzhou V* launch catapult the Chinese past the United States in space? No. In terms of technology and potential, the United States holds unqualified first place. Indeed the U.S. military space assets and capabilities are far ahead of everyone else's. A May 2003 report from the Council on Foreign Relations stated that China is at least two decades behind the United States in military technology and ability.⁴⁰ A U.S. military report issued in July 2003 predicted that it will be 2010–20 before the Chinese manned program is likely even to begin to contribute to improved military space systems.⁴¹ Constrained economic resources significantly limit Chinese activities in space, manned or otherwise.

Perceptions of a U.S. decline in space capabilities are usually based on two premises: that the United States no longer has the capability to reach the moon

and is now limited to low-Earth orbit, and that the Chinese have independently achieved success with their manned space program. True, the United States no longer has the capability for a manned moon mission. That is because the American public—without a strategic vision, pragmatic or otherwise—has not seen it as a priority, and elected politicians understand that. Generally speaking, one of the strengths of democracy is that the people get what they ask for, and in the United States that has not included manned spaceflight. The independent Chinese success is attributable to a conservative, incremental program, with the benefit of starting farther up the learning curve than the United States and Russia before it, and of sustained top-level political and economic support.

Working alone was in part a matter of choice, and in part the result of China's early exclusion from cooperative American outreach programs for historical reasons ranging from Mao's outrageous statements on the viability of nuclear war to the Cultural Revolution, human rights, and Tiananmen Square. That exclusion has been perpetuated by a combination of factors, including the overall status of U.S.-China political relations; the penchant of the Chinese for secrecy and their disinclination for reciprocal information sharing; the fact that the Chinese program was a completely military enterprise until 1998; and residual issues and attitudes from the Cox Committee Report. Further, until recently there was a strong feeling that China did not have much to offer in terms of either money or space technology.

The bottom line is that American space capabilities have not declined but that the United States has chosen to put its money and efforts elsewhere. In areas related to the military, U.S. capabilities have significantly increased. In other areas, the nation has simply changed direction—which can be considered good or bad, depending on perspective.

Shenzhou VI

Immediately following the triumphant return of Yang Liwei, the Chinese announced that a *Shenzhou VI* launch, carrying three taikonauts, would likely follow “within a year or two.” Although the interim is longer than some people, including this author, anticipated, it is really not surprising. More than anything else, economics will drive the Chinese timetable. There are, however, other factors as well.

Domestically, the Chinese want time for celebration. Yang Liwei is a hero, and a hero needs to be seen and made known. A special trip to Hong Kong was arranged for him, to do more “rallying” there. Before dimming his status by promoting a successor, the Chinese government wants to take full advantage of the hero worship and credit by association.

Externally, this period also provides China time to trawl for new partnerships of all types. Europe will likely be a main target. On 14 October 2003, the day

before the launch, China published a strategic policy paper stating that the European Union is the world's rising superpower, poised to overtake both the United States and Japan as the biggest trade and investment force in China.⁴² For their part, Europe is likely to welcome the Chinese. On launch day, the director-general of the European Space Agency (ESA) sent the warmest possible congratulations to China, declaring that the “mission could open a new era of wider cooperation in the world's space community.”⁴³ On a broader basis, closer ties with China benefit countries like France and Germany not only for the potential lucrative market they offer but as a potential combined strategic counterweight to American power, which is seen in Europe since Operation IRAQI FREEDOM as increasingly unilateral.⁴⁴

Finally, China is in no hurry. The fifteenth of October 2003 is a significant milestone in an already long and eventful history—and although the Chinese have no election cycles to consider, politicians are always anxious to rest on their laurels.

Secrecy versus Publicity

Commentaries before and after the launch of *Shenzhou V* described China as having taken a “clandestine approach” to space.⁴⁵ That impression has been reflected elsewhere as well. Indeed it is because of the obfuscation that has been the Chinese pattern, modeled after their former Soviet mentors, that this author's own 1998 book on the Chinese space program is subtitled “A Mystery within a Maze.”⁴⁶ But for many who have followed the program over time, quite contrary characterizations come to mind about *this launch*—such as, “amazingly open.” For months prior, China was uncharacteristically and refreshingly open with information. Websites were opened, glossy images were released and mass-distributed, and press releases abounded.

The reason for China's uncharacteristic approach is simple—you cannot get publicity without publicity, and you cannot sell products without advertising. To be seen as a country capable of potentially both selling space hardware and producing assorted high-tech goods for the world, China must change its image. This event was expected to go a long way in that regard. After the commercial launch failures in the 1990s involving launchers from the same Long March family that carried the *Shenzhou V* aloft, China very much wanted and needed to re-establish the Long March reputation for reliability, and Yang's launch certainly provided a highly visible opportunity.

When the Chinese first announced they would broadcast the launch live on CCTV and then backpedaled “on the advice of space experts,” Chinese Internet chat rooms buzzed with complaints, which were reported in the *People's Liberation Army Daily* newspaper.⁴⁷ Chinese citizens wanted to watch the launch broadcast live, and they let those feelings be known. Such open discontent greatly differs from what

would have been possible in China ten years ago and appears to represent a crack in the government stranglehold on information technology and expressions of public opinion. The decision not to go with a live broadcast was, however, not surprising. The inherent technical risks of space flight are substantial, and the subsequent risks to the Chinese leadership outweighed the payoff of a live broadcast. Once Yang—whose selection was not finalized until sixteen hours prior to liftoff and whose identity was not known until launch—was off the ground, coverage picked up almost immediately. If China broadcasts live and allows foreign reporters at Jiquan for the next event, that will be an indication of Chinese confidence in its technology and its people.

Image Issues

The launch followed on the heels of a critical plenary session of the Communist Party Central Committee in Beijing. At that meeting a wide-ranging economic reform package designed to ease China into a full market economy was endorsed; it was seen as the beginning of Hu's personal stamp on the government, and of his consolidation of power. The high-tech nature of the program fits closely with the new image Hu wants to promote of China as a modern, "wired" country, and it fits in as well with China's new, urban image of itself.

Sound bites on the "socialist market economy" are provided to the urban population that has moved rapidly from waving little red books in Tiananmen Square to logging-on in Internet cafes. The Chinese "get" globalization—for six months in 2001, the best-selling book in China was *How to Get Your Child into Harvard*.⁴⁸ The launch of Yang Liwei very much kept with this new image and directly linked it to the Communist Party. The message—that China is good, powerful, and modern—was consistently conveyed throughout the launch. Internationally and regionally the spillover was considerable, perhaps even more than China had hoped for.

During his flight Yang displayed miniature flags of both China and the United Nations. The latter was clearly a political message. The United Nations has long advocated exploration of space "for the good of all mankind," so in this way China was reaching out to developing countries in particular. It also symbolically acknowledged the role of the UN in global affairs, at a time when the United States was perceived as ignoring wishes of the UN in Iraq.

One point that clearly posed a dilemma for Beijing was how much to play up the military significance of the flight. The peaceful nature of the program's purposes was consistently stressed. Nonetheless, Hu Jintao at one point called Yang Liwei a "warrior," and several officials and media reports chose to juxtapose Yang's flight with the Chinese development of the atomic bomb, missiles, and satellites. Indeed, Chinese officials proudly pointed out that Yang's launch had

occurred thirty-nine years to the day after China exploded its first atomic bomb.⁴⁹ Further, high-level PLA officers were visible throughout the mission, and it was General Li Jinai who officially ordered then Lieutenant Colonel Yang to depart.

China is also walking an image tightrope with respect to economics. While wanting to be seen as the regional technology leader, China reaps pragmatic advantages from being considered a developing country. The ambiguity became apparent when a Japanese foreign ministry official raised postlaunch questions about why Japan was providing developmental assistance to a country with such advanced technological capability.⁵⁰

At the Bangkok APEC meeting three days after the launch, President Hu graciously accepted warm congratulations on Yang's flight, an achievement that played into China's shifting regional image. China's reputation was changing from that of regional bully to potential leader. One prominent Thai businessman was quoted in the *New York Times* as saying, "The perception is that China is trying to do its best to please, assist, [and] accommodate its neighbors while the U.S. is perceived as a country involved more and more on its own foreign policy agenda, and strong-arming everyone onto that agenda."⁵¹ The Chinese appear increasingly interested in balancing perceptions of unilateral strength with those of multilateral cooperation.

Technology Achievements versus Scientific Leaps

The Chinese success in launching and bringing back a taikonaut does not represent a quantum leap in science. Textbooks have taught the basics of rocket science for fifty-plus years. What the Chinese have demonstrated is a maturing of their own rocket engineering skills. Rocket engineering is basically a matter of close attention to thousands of minute details required to make an ultracomplex system work the first time and every time. More rockets today fail from human error than faulty designs. The Chinese recognize both the inherent dangers of spaceflight and the fact that "a tiniest mistake might lead to total failure."⁵² The success of the Chinese in rocket engineering is an achievement, even a breakthrough, for them, but that success does not equate to ability to leapfrog past American capabilities.

The Chinese are acutely aware of their dependence on others for certain scientific "core techniques." A postlaunch article in *People's Daily* pointed out that China is considered "with Brazil and India, in the 'marginal countries in science' which ranks at the fourth layer among the 'core countries in science,' 'powerful countries in science' and 'under-developed in science.'"⁵³ Obviously that is not where it wants to be, and they are relying heavily on space to push China up the science learning curve, as it has done for other countries.

Docking is expected to be China's next major area of space activity. China needs to perfect orbital docking technologies and procedures (like space walks) needed to place a space laboratory in orbit. That space lab is step two in China's announced three-step manned program, the third being an orbiting space station. The Chinese have stated that they are anticipating a smaller space station than *Mir* or ISS; they will likely build incrementally on orbital modules capable of independent spaceflight.

Manned missions to both the moon and Mars, though ambitiously laid out, are still officially spoken of in terms of "international" missions. On 29 November 2003 Luan Enjie, director of the Chinese National Aerospace Bureau, predicted, "By 2020, we will achieve visiting the moon"; commentators noted as important his use of a verb specifically connoting a human act.⁵⁴ However, nothing has been unambiguously announced or put in writing. Perhaps to inspire others, mention is sometimes also made of mining helium-3 as an energy resource.⁵⁵ China will be careful, however, not to overcommit early, not to state goals it will be unable to meet, and thereby set itself up for high-profile failure.

Problems and indeed catastrophic failure must be anticipated by Beijing. They, like Washington and Moscow, have little choice but to try to prepare their public for such events and convince them in advance that when they occur, the appropriate response will be to identify the problem, fix it, and move on.

Space on the Cheap

Prelaunch estimates had placed expenditures by the Chinese at between \$1.4 and \$2.2 million. Those numbers, however, are relatively meaningless, for several reasons. First, there are issues of currency conversion and the low "cost" figures for manufacturing and wages characteristic of an at least partly command economy. Additionally, the Chinese space research and development sector is generally unified with that of the military, and military expenditures are underestimated. Expenditures on manned spaceflight are therefore difficult to isolate and probably undervalued. After the *Shenzhou V* launch, Xie Mingbao, chief engineer for the manned space program, put the total program cost at eighteen billion *yuan*, or \$3.15 billion. Of that, he said, only one billion *yuan* had been for nonreusable equipment.⁵⁶ It is unclear, however, if his figures include such expenditures as those required for the tremendous prelaunch construction and expansion at Base 20, the East Wind launch site at Jiquan.⁵⁷ "Creative" accounting, problematic enough in U.S. space programs like the shuttle, seems even more likely in China, rendering the accuracy and comparative value of official numbers dubious.

Still, one of the few questions that the Chinese launch immediately provoked in the United States was why the Americans cannot "do space" on a keep-it-simple,

keep-it-cheap basis like the Chinese. The question raises the very real issue of balancing the desire to develop more technology beyond current capabilities—a reusable spaceplane, for example—with the need to work more cost-efficiently—using, say, simple, man-rated capsules.⁵⁸

WHAT LIES AHEAD?

Justifiably, China is encouraged by its success, and it will continue its manned-space efforts, for all the positive reasons already discussed. China also hopes for changes in its favor on the geostrategic Wei Qi board, now that it has joined the exclusive “club of three.” In interviews between the author and China Radio and Chinese print media, general questions about the U.S. attitude toward Yang Liwei’s flight quickly led to specific ones about how the launch might influence the administration, Congress, and the Pentagon in their dealings with China on issues like cooperation and export controls. Understanding the resistance to change in such perceptions, China has hedged its bets by continuing to remind the United States of its increasing technical capabilities in the military realm. In a 23 October 2003 *People’s Liberation Army Daily* article entitled “Space Is the Commanding Point for the Information Battlefield,” “information warfare” and “space supremacy” were cited as the key components of China’s battlefield “supremacy theory.” Cognizant that it is unable to match American capabilities, China continues to focus on countering the ability of a potential adversary—such as the United States—to employ fully its space assets. Clearly, the next move goes to the United States.

At the time of the *Shenzhou V* launch the United States had yet to decide what role, if any, manned space played in its own geostrategic plans. With regard to military space, however, the United States is neither undecided nor ambiguous in its goal—full-spectrum dominance. While that ambition offers the United States substantial strategic advantages, it also creates risks by impelling others to counter those advantages. China is considered the country with the highest potential desire and capability to counter U.S. space advantages. Because space is considered so critical to the futures of both countries, each considers it a zero-sum game, triggering an action-reaction cycle that threatens to escalate into an arms race of technology and countermeasure development.

While the United States can technologically mitigate some of the perceived risks from Chinese activities, others are better abated by political and diplomatic measures, or by proactive “shaping” to channel them into directions favorable to U.S. interests. For example, restricting Chinese access to Galileo navigation codes is out of the technical reach of the United States. Currently, however, Washington is not attempting to shape Chinese space activities through cooperation. While other countries, especially European countries, are trying to coax

China into further opening the door to meaningful information sharing and cooperation in areas of mutual interest, the United States has remained intransigent.

Apparently, since rumors of consideration of a reinvigorated U.S. manned space effort began within two months of the successful Chinese launch, Washington realized that “doing nothing” was not an option. If the United States ignored the Chinese launch, China would simply seek out and likely find other countries more favorably disposed to working with it. That would leave the United States in the seeming position of having been “caught,” if not overtaken, by the Chinese in a manned space race driven by public perceptions, as well as the very real likelihood of more unwanted partnerships, of the Galileo variety, between China and third nations or groups, with the United States increasingly the odd man out. Although the American public was apathetic about Yang Liwei’s flight, the fickle nature of the public meant that could change. If the Chinese continued with manned space activity and the United States continued on an ambivalent path, the latter would eventually have to decide if it were comfortable with an overall first place in space but gold medals for China in manned space exploration and development. China’s technology would not have outpaced that of the United States, but its sustained political commitment would have. With the status quo not being an option, the relevance of *how* the United States would reinvigorate its program becomes critical. Simply announcing intent says little, as the devil is always in the details.

The United States can declare a space race, unilaterally developing a long-awaited manned program to return to the moon or a manned Mars mission, or some combination of the two. However, it is unlikely that the ISS partners would support a program developed without their input; in fact, their post-*Shenzhou V* congratulatory messages, especially those of Russia and Europe, suggest that they would support no program that excluded the Chinese. Further, the continuing financial and technical problems of the still-incomplete ISS make it unlikely that its sponsors will be anxious to commit themselves, even if invited, to an expanded manned program. ISS is struggling. Debate followed the 20 October 2003 arrival of the fresh crew at the station when it was disclosed that some NASA staff felt the station unsafe, because air, water, and radiation monitors, medical devices, and some other systems were ailing or broken. NASA management itself declared the overall station safe, at least temporarily. Clearly, however, ISS needs immediate attention and possibly additional funding.

The benefits to the United States of a competitive approach are the same kinds it enjoyed earlier with Apollo—prestige, technology development, and jobs in aerospace. At the risk of losing face and allowing the technology gap to grow, China would be pushed to put more money into its manned program and

at a faster rate than it would otherwise have, thereby diverting it from military programs. It would be the equivalent of forcing the Soviet Union to spend money to counter Strategic Defense Initiative (“Star Wars”) technology. There are three drawbacks to this approach: Can the United States afford this kind of a program and maintain the requisite political will to fund it through completion? Is this really the best long-term strategy for long-term U.S.-China relations? Does, finally, the United States want to reinforce the view that it prefers unilateralism to multilateralism?

It can be argued that the United States does not really need to stay the course and bring a new space race to a conclusion; the Star Wars program was never completed but still significantly impacted the Soviet Union. But to start with anything less than full commitment sets up the program for failure. U.S. history is replete with visions and programs set forth from podiums and later forgotten. Further, programs are funded in support of policies. Historically, programs supporting policies primarily addressing political competition stand on tenuous ground. Apollo was such a program; when the policy of political competition with the Soviets changed, the reason for the program vanished, and its funding became precarious. Indeed, the last planned Apollo missions were canceled, even though prior missions had been astounding technical successes. From the Apollo and post-Apollo programs to Star Wars, the national aerospace plane to, unfortunately, the International Space Station, success has often been defined in terms other than program completion or potential for developmental follow-on.

Chinese officials often state that they will take an approach to space designed for long-term development and infrastructure, rather than one based on the Apollo model, which they characterize as visiting the moon and then abandoning the effort. Any new manned space program undertaken by the United States ought to be part of a continuing plan for development, not one with primarily short-term political goals. That being the case, the desire and ability to carry the economic burden alone must be considered. With a rising deficit, eighty-seven billion dollars as the first rebuilding bill in Iraq, an economy still in recovery, and the ongoing costs of the war on terrorism, that the American people would be willing to pay the entire bill for a manned space exploration program—no matter how much they conceptually liked it—is doubtful. As pointed out, manned space has been consistently viewed by the public as a good thing to do but low on the list of funding priorities.

Although wrapping a manned space program within a larger strategic vision is important and useful, political competition as a basis for that vision offers short-term motivation rather than long-term staying power, unless a race with China is in the best interests of the United States. But if spending the Soviets into

bankruptcy unquestionably played a role in the fall of communism in the USSR, the subsequent years of near state failure in Russia were in the interest of no one, nor would it be to repeat the experience in China. If China as an economically developing state is threatening to the United States, a China near implosion would likely be even more threatening. Finally, a competitive approach would unnecessarily and undesirably feed into the pervasive perception of the United States pursuing a course of imperial unilateralism.

The other alternative focuses on cooperation as the strategic vision, and the *how* option. It is imperative that policy makers consider what has brought the United States success in shaping programs, and what has (most often unintentionally) pushed countries into directions later regretted—such as the development of the European Ariane rocket after the United States declined to launch two European experimental communications technology satellites in order to avoid competition with the U.S. communications satellite industry. The United States has a long and productive tradition of international cooperation in space. Especially in the areas of space science and remote sensing, the United States has historically viewed space as an opportunity to build bridges with countries while simultaneously co-opting them into working on areas of its choice rather than areas not to its liking. Cooperation is clearly the better option with China too—starting slow, perhaps in space science projects or environmental monitoring, but leading toward a larger role for the Chinese in a renewed strategic vision for manned exploration and development, as long as reciprocity and transparency are maintained.

Specifically, a U.S. proposal for a multilateral review and expansion of manned space exploration, from ISS to perhaps a lunar and even Mars mission, on an incremental and inclusive basis, would allow the United States to revitalize its manned space program and space leadership and to influence the future direction of the Chinese space program as well. This option would both counter the prevailing view of a unilateralist American geostrategic approach and allow for a paced, infrastructure development–focused approach without taking on unrealistic budget burdens. While there is the risk that international politics will intrude over time, it is counterbalanced by the vested interest in system stability such a program would give participants.

There would be resistance. Speaking at a meeting of the Space Frontier Conference in Los Angeles a few days before the *Shenzhou V* launch, for example, Congressman Dana Rohrabacher, a California Republican, called the mission a “disgrace,” citing China’s poor human rights record and charges that China’s space program and military applications had benefited from sensitive technologies supplied by American companies. Isolating China, however, reinforces a Chinese stance counterproductive to U.S. interests, as a world without China is

simply not possible for the United States. American and Chinese interests frequently overlap—on North Korea and the global war on terror, for example, not to mention economics. While the U.S.-China trade deficit looms large in bilateral relations, even that represents engagement between the two countries that cannot be ignored and is indeed likely to expand. Further, other countries are clearly interested in working with China on space, regardless of the American stance. Therefore, the United States can either be involved and retain some measure of control through leadership, or watch from the sidelines.

The United States has an opportunity to step in, much as it did with Russia after the fall of the Soviet Union, and use space cooperation to its advantage. Bringing China incrementally into the larger international family of space-faring nations, to include eventually International Space Station participation and potentially even more, would not force the ISS partners to choose between working with China or the United States. Cooperation would tend to generate support for an international lunar or Mars mission, and it would establish the United States as the multinational mission leader. The United States should craft a new directive for the American space program, one based on the inclusion of other countries. An inclusive vision will give the nation an opportunity to assume the mantle of leadership in a mission that could inspire the world. On the larger, geostrategic Wei Qi board, cooperation is the best position for the United States and the future.

NOTES

1. Some Chinese use the word *yuhangyuan* rather than *taikonaut*.
2. Cited by John Pomfret, "China's First Space Traveler Returns a Hero," *Washington Post*, 16 October 2003, p. 1.
3. David E. Sanger, "Bush Lauds China Leaders as 'Partners' in Diplomacy," *New York Times*, 10 December 2003. At one point, the Chinese had considered sending Yang Liwei to the United States with Wen Jiabao; they decided against it when the situation between China and Taiwan became touchy in November.
4. See Phillip Saunders et al., "China's Space Capabilities and the Logic of Anti-Satellite Weapons," available at cns.miis.edu/pubs/week/020722.htm.
5. Regarding China's own navigation system, see Geoffrey Forden, "Strategic Uses for China's Bei Dou Satellite System," *Jane's Intelligence Review* (October 2003).
6. "China Joins EU Space Program to Break U.S. GPS Monopoly," *People's Daily Online*, 27 September 2003.
7. Dean Cheng, "China and the International Space Community: A Brief Overview," *Chinese Military Update* (October 2003).
8. For background on the Chinese program see Joan Johnson-Freese, "China's Manned Space Program: Sun Tzu or Apollo Redux?" *Naval War College Review* 56, no. 3 (Summer 2003), pp. 51–71.
9. The Chinese number their programs. The first two numbers, for example, indicate that it was started in 1992.
10. The earlier program, called Shuguang (Dawn), was canceled due to difficulties with both technology and funding.

11. "China Declares Manned Spaceflight Successful," *People's Daily Online*, 16 October 2003.
12. Pomfret, "China's First Space Traveler Returns a Hero," p. 1.
13. Not only Jiang was absent but Wu Bangguo, head of the National People's Congress and considered to be "Jiang's man."
14. Antoaneta Bezlova, "Science: By Launching a 'Taikonaut,' China Enters the Space Race," *Global Information Network*, 15 October 2003, p. 1.
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16. "India Can Match China's Space Programme," *Times of India*, 16 October 2003.
17. "Indian Prime Minister Hails Chinese Manned Space Flight," Agence France Press, 18 October 2003.
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22. NASA, particularly during Apollo, was known for its youthful culture. Since the 1990s, however, NASA has faced difficult workforce issues. See U.S. Senate, *Statement by NASA Administrator Sean O'Keefe*, "NASA Workforce Issues," Governmental Affairs Committee, 6 March 2003.
23. Jack Kelly, "U.S. the Leader in War Plans for Space: Gaining the Ultimate Highground," *Pittsburgh Post-Gazette*, 28 July 2003.
24. The report is available at www.defenselink.mil/pubs/spaceabout.html.
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26. Available at American Foreign Policy Council, www.afpc.org/crm/crm331.htm.
27. Loring Wirbel, "U.S. 'Negation' Policy in Space Raises Concerns Abroad," *EE Times*, 22 May 2003.
28. "Advantages of 'Shenzhou' Spacecraft, 'Long-March' Carrier Rocket," *People's Daily*, 21 October 2003, available in English at fpeng.peopledaily.com.cn/home.shtml.
29. See the June 2000 issue of *Xiandai Bingqi*, the monthly journal of a military technology research institute, referenced in James Oberg, "China's Great Leap Upward," Scientific American.com, www.sciam.com, 15 September 2003.
30. "Advantages of 'Shenzhou' Spacecraft, 'Long-March' Carrier Rocket." For the Western citation, Craig Covault, "Shenzhou Solos," *Aviation Week & Space Technology*, 20 October 2003, p. 22.
31. Swedish engineer and analyst Sven Grahm provides interesting tracking data on the *Shenzhou V* mission, at www.svengrahm.pp.se/histind/China12/Shenzhou5.html. Also, in November 2003 the republic of Kiribati, where one of China's two external tracking sites is located, recognized Taiwan diplomatically. That created significant issues for China—breaking relations with Kiribati in response risked forfeiting the tracking site. Philip P. Pan, "Tiny Republic Embraces Taiwan, and China Feels Betrayed," *Washington Post*, 27 November 2003, p. A15.
32. The Air Force Manned Orbiting Laboratory, MOL, for example, was canceled in the 1960s.
33. Craig Covault, "Chinese Milspace Ops," *Aviation Week & Space Technology*, 20 October 2003, p. 26.
34. "Congratulations to the Chinese," *Congressional Record*, 15 October 2003.
35. Available at International Information Programs, usinfo.state.gov/topical/pol/terror/texts/03101506.htm. Challenges to the report, though significant, have been largely ignored, leaving the findings to become fact. While a significant toll has been taken to the once-budding Chinese commercial launch industry since that action, the U.S. satellite industry has been hit hard too, since the United States does not have a monopoly on satellite

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 41. U.S. Defense Dept., *Annual Report on the Military Power of the People's Republic of China: Report to Congress*, 28 July 2003, available at www.4law.co.il/Lea1.pdf.
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